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RESEARCH PAPER

Perception of farmers on varietal traits and constraints in adoption of improved variety (TS-3R) and existing varieties of pigeonpea

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Abstract: Pigeon pea (*Cajanus cajan* L.) is the third largest produced food legume in South Asia after chickpea and dry beans and an important grain legume crop of the semi-arid regions and also recognized as the second most important pulse crop in India. In the year 2020, based on highest area under pegion pea the present study was confined to two districts of Northern Dry Zone of Karnataka *viz.,* Vijayapur and Bagalkot.The study was aimed to assess the constraints faced by farmers in adoption of improved varieties of pigeon pea.The results of the study revealed that the major constraints faced by the pigeon pea growers were non-availability of labour, less remunerative price for produce, lack of knowledge on location specific improved varieties of pigeon pea, lack of knowledge about demonstrations and training programmes etc. It can also be found that all the adopted sample farmers were positive about the higher grain yield of the TS-3R variety.

Key words: Bagalkot, Constraints, Perceptions, Pigeon pea, Vijayapur

Introduction

Pulses have been considered as the poor man's source of protein and play a vital role in nutritional security. They are rich source of protein in the diet of traditionally vegetarian population of India and contain two to three times more protein than cereal grains. Pulses are inseparable and integral part of the cropping system for sustainable agriculture followed all over the country since time immemorial.

India's total pulses' area, production and productivity were 30.83 m ha, 21.52 m t and 698 kg per ha, respectively. While, Karnataka state is one among top five India's major producers of pulses. During 2019-20, Karnataka accounted for around 11per cent of total area and nine per cent of total production with an area coverage, production and productivity around 31.12 lakh ha, 21.56 lakh tonne and 693 kg per ha, respectively. Karnataka is India's one of the leading states for pulse cultivation, ranking fourth in terms of area and fifth in terms of production. Pulses are primarily grown in North-Eastern dry zone and Northern dry zone of Karnataka.

Pigeonpea (*Cajanus cajan L.*) belongs to leguminoceae family, is the third largest produced food legume in South Asia after chickpea and dry beans. It is an important grain legume crop of the semi-arid regions and also recognized as the second most important pulse crop in India. It is predominantly a crop of tropical areas mainly cultivated in semi-arid regions of India. It is grown in the areas having an annual rainfall of 60-140 cm of which 80-90 per cent was received during the rainy season. Temperature beyond 40^0c is harmful to the crop while, 26–30^0c is the optimum.

Pigeonpea was grown over an area of 56.16 lakh ha worldwide in 2019 with a production of 44.26 lakh t and productivity of 788 kg per ha. India is the largest pigeonpea producing country accounting for 81 per cent and 75 per cent of the global pigeonpea area and production, respectively.

India is the world's largest pigeonpea grower, consumer, and importer. It is grown on an area of 45.32 lakh ha with production of 38.92 lakh t with an average productivity of 859 kg ha. Karnataka stands first in terms of area and production of pigeonpea crop followed by Maharashtra and these two states collectively contribute around 60 per cent of area and 57 per cent of production in India.

In India, Karnataka is contributing around 34 per cent and 29 per cent of total area and production of pigeonpea in India, respectively. It is cultivated over an area of 15.45 lakh ha with production of 11.26 lakh t with an average productivity of 729 kg per ha (Anon, 2020).

Material and methods

Study area

The main objective of the present research is to analyze perception of farmers on varietal traits and constraints in adoption of improved variety (TS-3R) and existing varieties of pigeonpea in Northern Dry Zone (Zone III) of Karnataka. In first stage Vijayapur and Bagalkot districts were selected for the study based on highest area under pigeonpea and in second stage two taluks were selected from each district for the study based on highest aea under pigeonpea and in third stage two villages from each taluk were selected.

Sampling procedure and source of data

A multistage random sampling procedure was used for the selection of sample farmers. For the study, 144 farmers were chosen, out of which 80 farmers cultivating improved pigeonpea variety (TS-3R) and 64 farmers cultivating corresponding local existing variety were chosen in the same areas as counterfactual. The primary data needed for the study was collected from the sample farmers through personal interview method by using pre-tested schedule.

Analytical tools and techniques used

1. Descriptive Statistics

Descriptive statistics such as frequency and percentage were used to analyze the perception of farmers on varietal traits.

2. Garrett's Ranking Technique

The constraints faced by the sample farmers during adoption of pigeonpea varieties were ranked by using Garrett's ranking technique. As per this method, respondents were asked constraints that they were faced in adoption of pigeonpea varieties. Depending upon extent of constraints faced by them rankings was assigned separately to each constraint. Likewise, ranks were assigned to different frequency of various factors/ parameters. The results of such rankings were converted into score value by using following formula.

Per cent position = 100* (Rij-0.5) /Nj

Where,

Rij = Rank given for the ith factor by jthrespondent.

Nj = Number of factors ranked by the jth respondent.

The per cent position of each rank was converted to scores by referring to tables given by Garret and Woodworth (1969). Then for each factor, the scores of individual respondents were summed up and divided by total number of respondents for whom scores were gathered. The mean scores for all the factors were ranked.

Results and discussion

The constraints faced by farmers in adopting improved and existing varieties of pigeonpea were observed by using Garrett's ranking technique and are provided in Table 1. These constraints are further divided into three sub-headings like Production, Marketing and Managerial constraints.

Production constraints

The top five key production issues faced by pigeonpea producers in the study region were non- availability of labour with the Garrett score of 64.57 which was mainly due to urbanization as there is availability of more earning opportunities than rural areas, followed by high cost of pesticides (56.69), non -availability of required quantity of FYM (55.67), non-availability of bio fertilizers and bio-pesticides in time (53.20) and high cost of improved seed (51.51). The other production related constraints includes lack of supply of improved seed, harvesting cost is high, resistance of insects against insecticides, lack of knowledge about bio fertilizers and bio-pesticides, lack of knowledge about seed treatment. The results were in line with the study of Muthuprasad (2018) and Shashikumar (2015).

Marketing constraints

The top five key marketing issues faced by pigeonpea growers in the study region include less remunerative price for produce with the Garrett score of 63.64 which was due to

Table 1. Constraints in adoption of improved variety and existing varieties of pigeonpea

Constraints	Garret score	Rank
Production constraints		
Non-availability of labour.	64.47	I
High wage rate of labour and hired machines	56.69	II
Non -availability of required quantity of fertilizers/FYM	55.67	III
Non-availability of bio fertilizers and bio-pesticides in time.	53.20	IV
Lack of knowledge about bio fertilizers and bio- pesticides	51.51	V
Higher cost of plant protection chemicals	50.03	VI
Harvesting cost is high	48.09	VII
Insects are resistant to chemical spray	45.92	VIII
High cost of improved seed	43.01	IX
Lack of supply of improved seed	29.42	X
Marketing Constraints		
Less remunerative price for produce	63.64	
High rate of interest for non-institutional credit	57.57	II
High price fluctuation.	54.49	III
Lack of storage facility	52.24	IV
Lack of processing facility.	50.61	V
Lack of cooperative marketing organization	49.14	VI
Lack of marketing information	47.14	VII
Regulated market is far away from the village	45.18	VIII
High transportation cost for market	43.40	IX
Non acceptance of pigeon pea varieties by the traders	34.59	X
Managerial Constraints		
Lack of knowledge on location specific improved varieties of pigeon pea	64.40	I
Lack of knowledge about demonstrations & training programmes	58.29	II
Inability to plan in advance about the incidence of pest and diseases	55.21	III
Not able to contact extension agencies at the time of necessity	51.86	IV
Lack of knowledge regarding improved agrochemical practices of pigeon pea	48.44	V
Lack of knowledge about insect pest & disease control	40.92	VI
Mislead by input dealers regarding plant protection chemicals	30.88	VII

Table 2. Specific constraints faced by farmers in adoption of TS 3R variety of pigeonpea

Constraints	Garret score	Rank
Lack of knowledge on location specific improved varieties of pigeonpea	64.40	I
Less remunerative price for produce	63.64	II
Lack of knowledge about demonstrations & training programmes	58.29	III
Lack of marketing information	47.14	IV
Higher cost of improved seed	43.01	V
Non acceptance of pigeon pea variety by the traders during initial period	34.59	VI
Lack of supply of improved seed	29.42	VII

mismatch between demand and supply of pigeonpea in the market followed by high rate of interest for non-institutional credit (57.57), non-acceptance of pigeonpea varieties by the traders (54.49), high price fluctuation (52.24), lack of processing facility (50.61). The other marketing related constraints includes lack of cooperative marketing organization, high transportation cost for market, regulated market is far away from the village, lack of storage facility and lack of marketing information. These results were in parallel with the study conducted by Singh *et al*. (2015) and Umunakwe *et al*. (2015).

Managerial constraints

The top three major managerial issues faced by pigeonpea producers in the study region include lack of knowledge on location specific improved varieties of pigeonpea with 64.40 Garret score followed by lack of knowledge about demonstrations and training programmes (58.29), inability to plan in advance about the incidence of pest and diseases (55.21) which may be due to lower education level of non- adopter farmers leading to lack of awareness regarding importance and significance of improved varieties and lack of knowledge regarding demonstrations and training programmes which are crucial in building confidence in farmers to take up improved and recommended practices. The other managerial related constraints include inability to contact extension agencies at the time of necessity, lack of knowledge regarding improved agro chemical practices of pigeonpea, lack of knowledge about insect pest and disease control and improper guidance, mislead by input dealers regarding plant protection chemicals.These constraints gain support from the studies of Swapnil (2021), Gireesh *et al*. (2018) and Chaubey (2020).

Specific constraints faced by farmers in adopting TS-3R variety of chickpea

Lack of knowledge regarding location specific improved varieties with 64.40 Garrett score was one of the major constraints faced by adopted farmers (Table 2), followed by less remunerative price for the produce (63.64) and lack of knowledge regarding demonstrations and training programmes (58.29). Other constraints like, lack of marketing information (47.14), higher cost of improved seeds (43.01), non-acceptance of pigeonpea variety by traders during initial period (34.59) and lack of supply of improved seeds (29.42) had minimal limiting effect.The reason might be lower education level leads to lowered bargaining ability based on Minimum Support Price (MSP) provided by government and improper access to marketing information.These results are in line with the findings of Chaubey (2020) and Gireesh *et al*. (2018).

Table 3. Farmers' perception towards TS 3R pigeonpea variety

Particular	Frequency	Per cent
High grain yield	80	100
Bold grain size	74	93
High grain weight	74	93
Disease resistance	65	81
Insect resistance	56	70

Farmers' perception towards TS-3R pigeonpea variety

All the TS 3R adopted respondents responded positively about the higher grain yield of the variety found in Table 2 and majority of the adopters agreed with bolder grain size and higher grain weight and some of the adopters reacted positively with disease resistance and insects' resistance of the TS 3R pigeonpea variety. The reason is that TS 3R variety has some desirable traits like higher grain yield, bold and uniform size of grain, resistance to wilt disease which is common in pigeonpea growing areas. Some of these traits were realized by majority of farmers. The results are in line with the study of Ayenan *et al.* (2017) and Karunathilaka and Thayaparan (2016).

Conclusion

From the findings, it can be concluded that non-availability of labour, high wage rate of labour, hired machines and non-availability of required quantity of fertilizers/ FYM were the major production constraints faced by the pigeonpea growers. Along with that less remunerative price, high rate of interest for non-institutional credit and high price fluctuation were the major marketing constraints. Whereas lack of knowledge of specific improved varieties and lack of knowledge about demonstrations and training programmes were the major managerial constraints. The adopted farmers opined that improved variety (TS-3R) gives more grain yield, bold grain size and high grain weight than the existing varieties of chickpea. From the study it can be suggested that there is a need to conduct training programmes, field demonstrations and field visits at village level campaigns in order build confidence and to create awareness by extension workers. The required information has to be disseminated through different digital platforms like mobile apps, internet, YouTube and radio etc. along with these there is a need to provide custom hiring centers at village level to supply inputs at cheapest price which will help farming community.

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